TN0081183
EEO

EAST TENNESSEE NATURAL GAS, LLC
5400 Westheimer Court
Houston, TX 77056-5310

Mailing Address:
P.O. Box 1642
Houston, TX 77251-1642

Spectra Energy Partners

August 20, 2012

Ms. Tina Robinson
Tennessee Department of Environment and Conservation
Johnson City Environmental Field Office
2305 Silverdale Road
Johnson City, TN 37601
E-mail: tina.a.robinson@tn.gov

Re: **Macroinvertebrate Biological Monitoring Report Spring 2012**
NPDES Permit No. TN0081183
Northeastern Tennessee Project (NET Project)
East Tennessee Natural Gas, LLC (ETNG)

Dear Ms. Robinson:

As required by NPDES permit TN0081183 and ETNG's Revised Macroinvertibrate Biological Monitoring Plan dated February 11, 2001, ETNG has conducted the pre-construction macroinvertebrate monitoring event. Qualified and experienced personnel from D.R. Allen & Associates conducted the monitoring event March 16 and 23, 2012. At least two qualified individuals made up each sampling team Please find enclosed the NET Project Macroinvertebrate Biological Monitoring Report Spring 2012.

A copy of the report will be sent to Ms. Erin O'Brien in the Nashville Office and to the Planning and Standards Section of the Division of Water Pollution Control in Nashville.

Please contact me at (713) 627-5388 or rheuer@spectraenergy.com if you have any questions or need additional information. Thank you.

Sincerely,

Ronald V. Heuer

Ronald V. Heuer
Environmental Construction Permitting

Attachment

cc: Ms. Erin O'Brien, TDEC, Nashville Office
Planning and Standards Section, Nashville Office

BIOLOGICAL MONITORING REPORT
NORTHEASTERN TENNESSEE PROJECT
SPRING 2012

Jonathan E. Stamper, Clinton W. Steele, Prescott J. Weldon, and Laura Beth Hale
D.R. Allen & Associates
Abingdon, Virginia

Purpose

D.R. Allen & Associates, P.C. was retained by East Tennessee Natural Gas, LLC and Natural Resources Group, LLC to conduct macroinvertebrate biological monitoring for the Northeastern Tennessee (NET) Project. This effort was conducted in order to comply with NPDES Permit No. TN0081183 and ETNG's Revised Macroinvertebrate Biological Monitoring Plan (Plan) dated February 11, 2011. The purpose of the monitoring is to determine the biological integrity and diversity of the receiving streams pursuant to the relevant Tennessee Water Quality Criteria for those streams.

Summary

As required in the NPDES Permit, ETNG has conducted two macroinvertebrate monitoring events, one prior to construction and then a second repeated one year later. The pre-construction monitoring event occurred on March 17 and 21, 2011. The post-construction results that occurred on March 16 and 23, 2012 are provided herein. Stream assessments were conducted by analysis of benthic macroinvertebrates as well as conducting habitat assessments, collecting surface water samples, and performing both in-situ and laboratory water quality analyses from four monitoring locations (see Appendix A). Photos of each monitoring location are provided in Appendix B.

Methodology

Habitat evaluation and macroinvertebrate sampling were conducted in accordance with the methodologies contained in the *State of Tennessee, Department of Environment and Conservation, Division of Water Pollution Control, Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys* (October 2006). Sampling was conducted by a team of qualified biologists from D.R. Allen and Associates. The same DR Allen team members conducted both the 2011 and 2012 sampling efforts.

The benthic macroinvertebrate samples were sub-sampled to a target number of 200 individuals and identified to genus level. In-situ water quality measurements (water temperature, dissolved oxygen, pH, conductivity, turbidity, and flow) were made in the field prior to macroinveretebrate sampling using aYSI Pro Plus multi-parameter meter, a Hanna 98703 turbidimeter, and a Marsh-Mcbirney flow meter. Laboratory water analyses (total suspended solids, total dissolved solids) were conducted by Environmental Mangement Services, Inc. (US EPA Laboratory ID VA01164).

Field work for surveys was conducted on March 16 and 23, 2012.

Results

Sampling results are contained in the following attachments: Table 1 lists individual habitat parameters and individual and total habitat scores; Table 2 shows the biometric scores; Table 3 includes the raw macroinvertebrate data; Table 4 contains the water quality data.

Results

Table 1. Habitat Assessment – High Gradient Form

Habitat Parameter	Dodson Creek	Gap Creek	Kendrick Creek	Puncheon Camp Ck.
Epifaunal Substrate	11	8	16	10
Embeddedness	6	6	14	7
Velocity/Depth Regime	8	10	16	8
Sediment Deposition	6	5	11	6
Channel Flow	16	18	18	18
Channel Alteration	16	13	12	11
Frequency of Riffles	10	6	15	11
Bank Stability	4	10	16	4
Vegetative Protection	12	12	18	8
Riparian Vegetative Zone Width	12	6	8	13
Total Habitat Score	**101**	**94**	**144**	**96**

Table 2. Macroinvertebrate Biometrics

Site ID	Taxa Richness	EPT Taxa Richness	% EPT –Cheum.	% Chironomidae & Oligochaeta	% Nutrient Tolerant	% Clingers	North Carolina Biotic Index
Dodson Ck.	28	12	47.8	8.4	21	37.8	**4.12**
Gap Ck.	37	12	37.9	29.8	29.3	36.5	**4.87**
Kendrick Ck.	27	12	38	18.5	40.2	37.5	**4.44**
Puncheon Camp Ck.	16	6	31.9	4	64.4	14.7	**5.99**

Table 3. Macroinvertebrate 200-Organism Sub-Sample Data

Order	Family	Final ID	Dodson Ck.	Gap Ck.	Kendrick Ck.	Puncheon Camp Ck.
Coleoptera	Carabidae	Carabidae	1	0	0	0
	Elmidae	Dubiraphia	1	6	0	1
		Optioservus	3	2	1	1
		Stenelmis	4	4	51	4
	Psephenidae	Psephenus	1	1	8	0
Diptera	Chironomidae	Chironomini	0	1	0	0
		Apedilum	0	1	0	0
		Dicrotendipes	0	3	0	0
		Microtendipes	0	2	0	0
		Eukiefferiella	8	0	0	1
		Krenopelopia	4	9	4	2
		Orthocladiinae	1	9	2	0
		Orthocladius	0	31	4	0
		Paratendipes	0	1	0	1
		Polypedilum	2	2	0	0
		Tribelos	0	2	0	0
		Tvetenia	0	0	3	0
	Empididae	Hemerodromia	0	0	1	0
		Trichoclinocera	0	1	0	0
	Simuliidae	Simulium	19	15	7	1
	Tabanidae	Chrysops	0	1	2	1
		Tabanus	1	0	0	0
	Tipulidae	Tipula	3	13	4	0
		Antocha	0	1	3	0
Ephemeroptera	Ameletidae	Ameletus	1	1	0	6
	Baetidae	Baetis	3	0	3	0
		Heterocloeon	7	0	0	0
	Caenidae	Caenis	0	12	0	3
	Ephemerellidae	Ephemerella	3	20	13	0

Table 3. Cont.

Order	Family	Final ID	Dodson Ck.	Gap Ck.	Kendrick Ck.	Puncheon Camp Ck.
Ephemeroptera	Ephemeridae	Ephemera	0	0	2	0
	Heptegeniidae	Maccafertium	2	6	3	0
		Stenonema	5	14	16	2
	Isonychiidae	Isonychia	0	0	5	0
	Leptophlebiidae	Paraleptophlebia	0	2	0	3
Isopoda	Asellidae	Lirceus	23	14	11	120
Megaloptera	Corydalidae	Nigronia	0	1	1	0
Odonata	Calopterygidae	Calopteryx	1	1	0	0
	Gomphidae	Gomphus	0	1	0	0
		Stylogomphus	1	4	0	0
Annelida	Oligochaeta	Lumbricidae	1	1	5	2
Plecoptera	Nemouridae	Amphinemura	56	7	17	24
	Perlidae	Acroneuria	1	3	0	0
		Paragnetina	0	0	1	0
	Perlodidae	Isoperla	24	8	8	25
Trichoptera	Hydropscycidae	Cheumatopsyche	11	2	10	0
	Limnephelidae	Hydatophylax	0	4	0	0
	Odontoceridae	Psilotreta	0	2	0	0
	Philopotamidae	Chimarra	2	0	1	0
	Polycentropodidae	Cernotina	0	0	3	0
	Rhyacophilidae	Rhyacophila	1	0	0	0
		Total Individuals	**190**	**208**	**189**	**197**
		Total Taxa	**28**	**37**	**27**	**16**

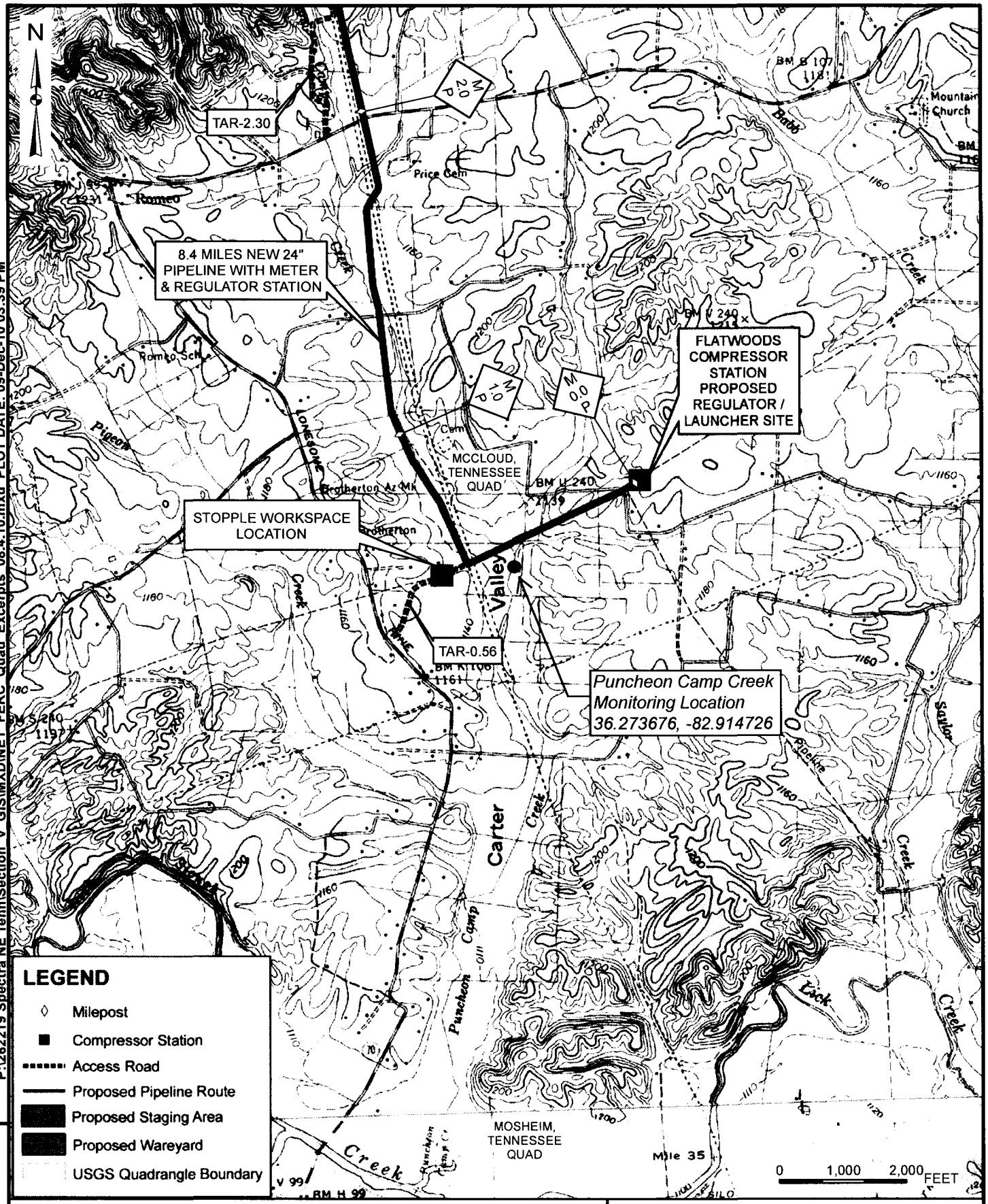
Table 4. Water Quality Data

Parameter	Description\units	Dodson Ck.	Gap Ck.	Kendrick Ck.	Puncheon Camp Ck.
Water Temperature	°F	61.0	54.9	62.2	62.2
Dissolved Oxygen	mg/l	9.6	10.89	10.22	9.70
pH	S.U.	7.35	8.20	8.45	7.52
Conductivity	umhos/cm	273.1	268.1	370.7	568
Turbidity	NTU	9.1	*	6.39	16
Flow	cfs	9.02	4.21	28.28	2.75
Total Suspended Solids	mg/l	8	11	7	17
Total Dissolved Solids	mg/l	254	294	294	482

* Parameter not available.

APPENDIX A

SITE LOCATION MAPS



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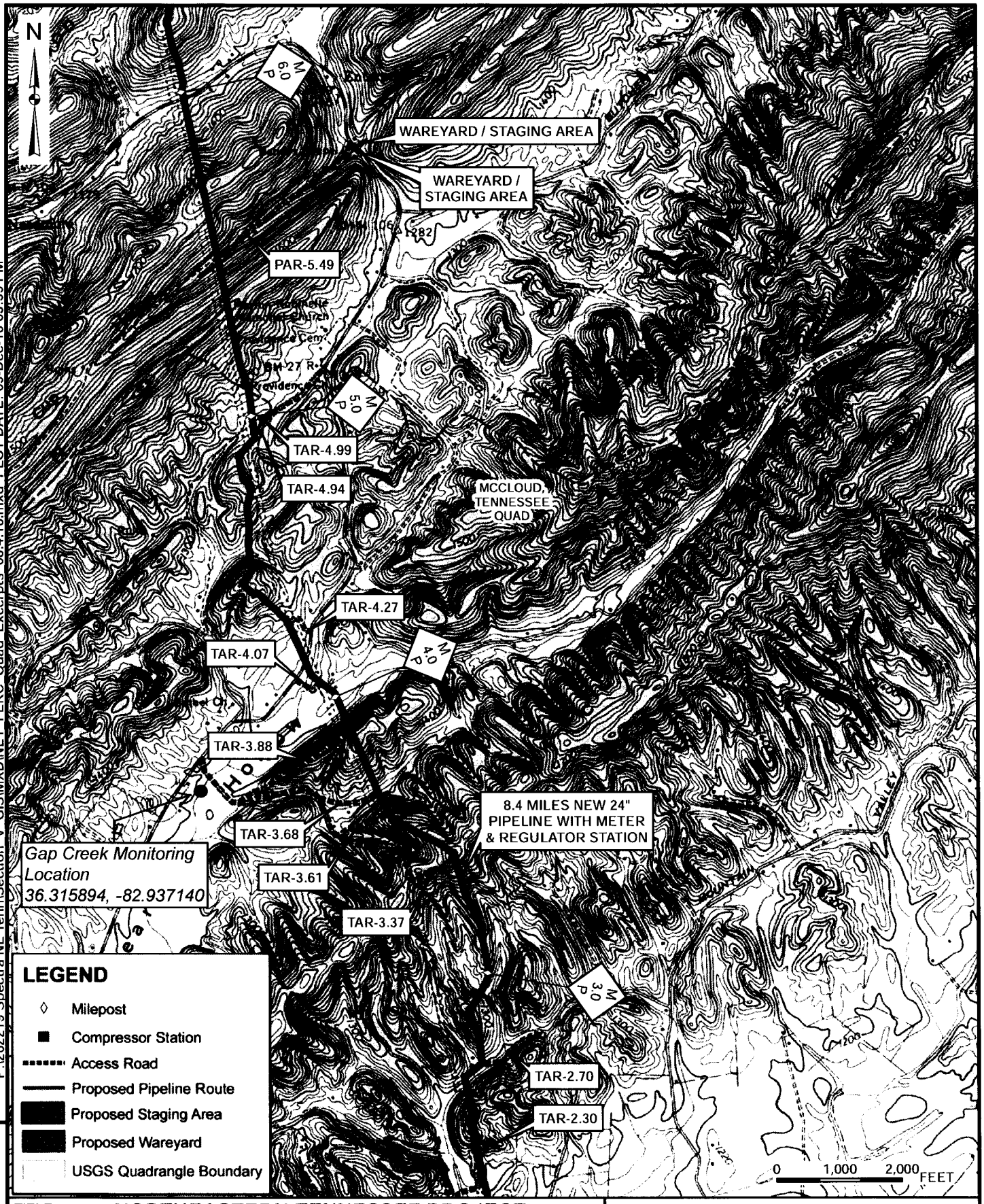
LOC.: GREENE COUNTY, TN				REV. 4
CKD. BY: HMMHOL	ENG.		DATE: 12/9/2010	W.O.
DRN. BY: HMMHOL	SCALE: 1" = 2000'		DWG. NO. FW-E-6501	

I.G.

Spectra Energy Partners

East Tennessee Natural Gas, LLC
5400 Westheimer Ct. Houston, TX 77056-5310 713 627-5400



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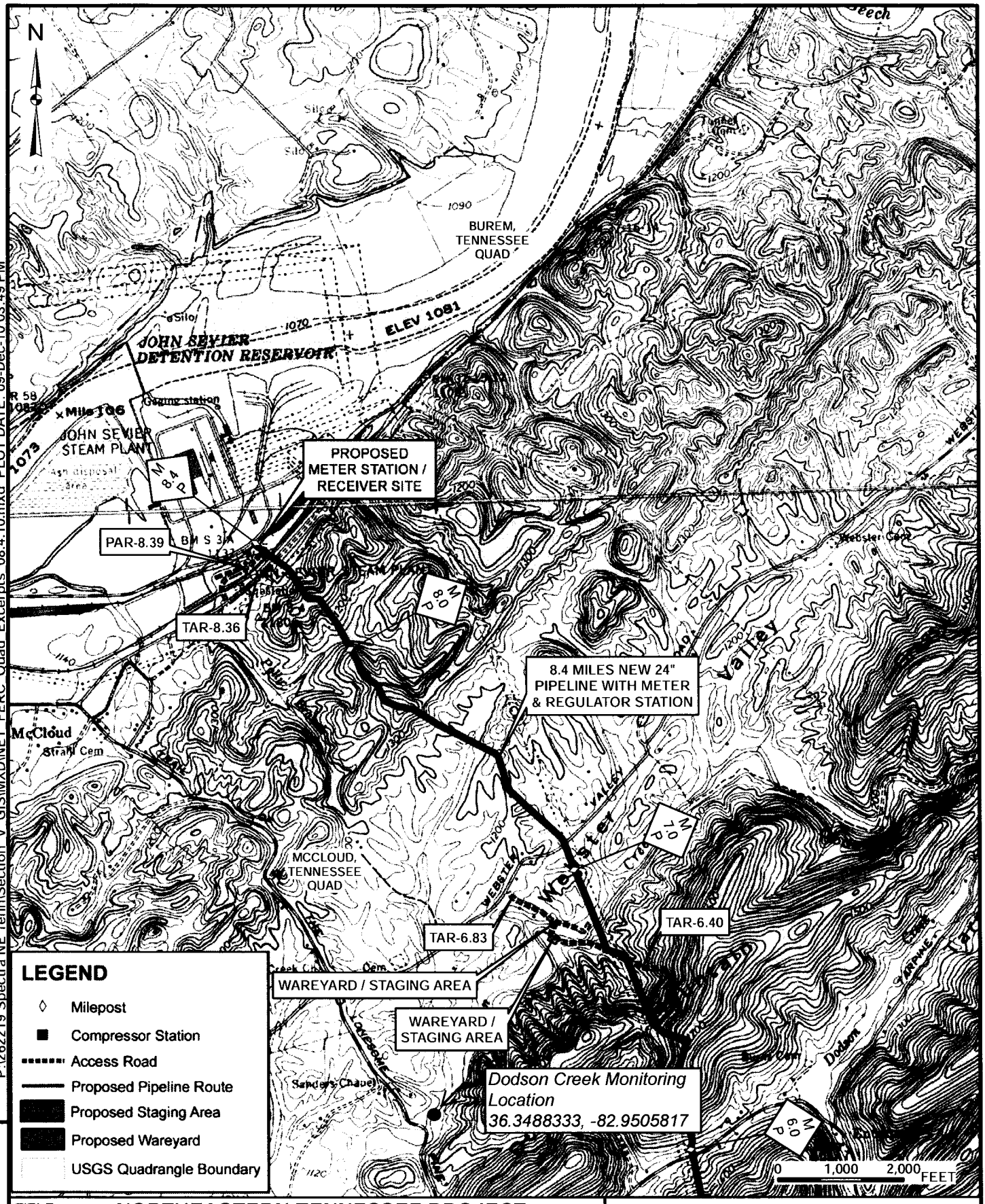
CKD. BY: HMMHOL	ENG.		DATE: 12/9/2010	W.O.
DRN. BY: HMMHOL	SCALE: 1" = 2000'		DWG. NO. FW-E-6502	

Spectra Energy Partners

East Tennessee Natural Gas, LLC
5400 Westheimer Ct. Houston, TX 77056-5310 713 627-5400



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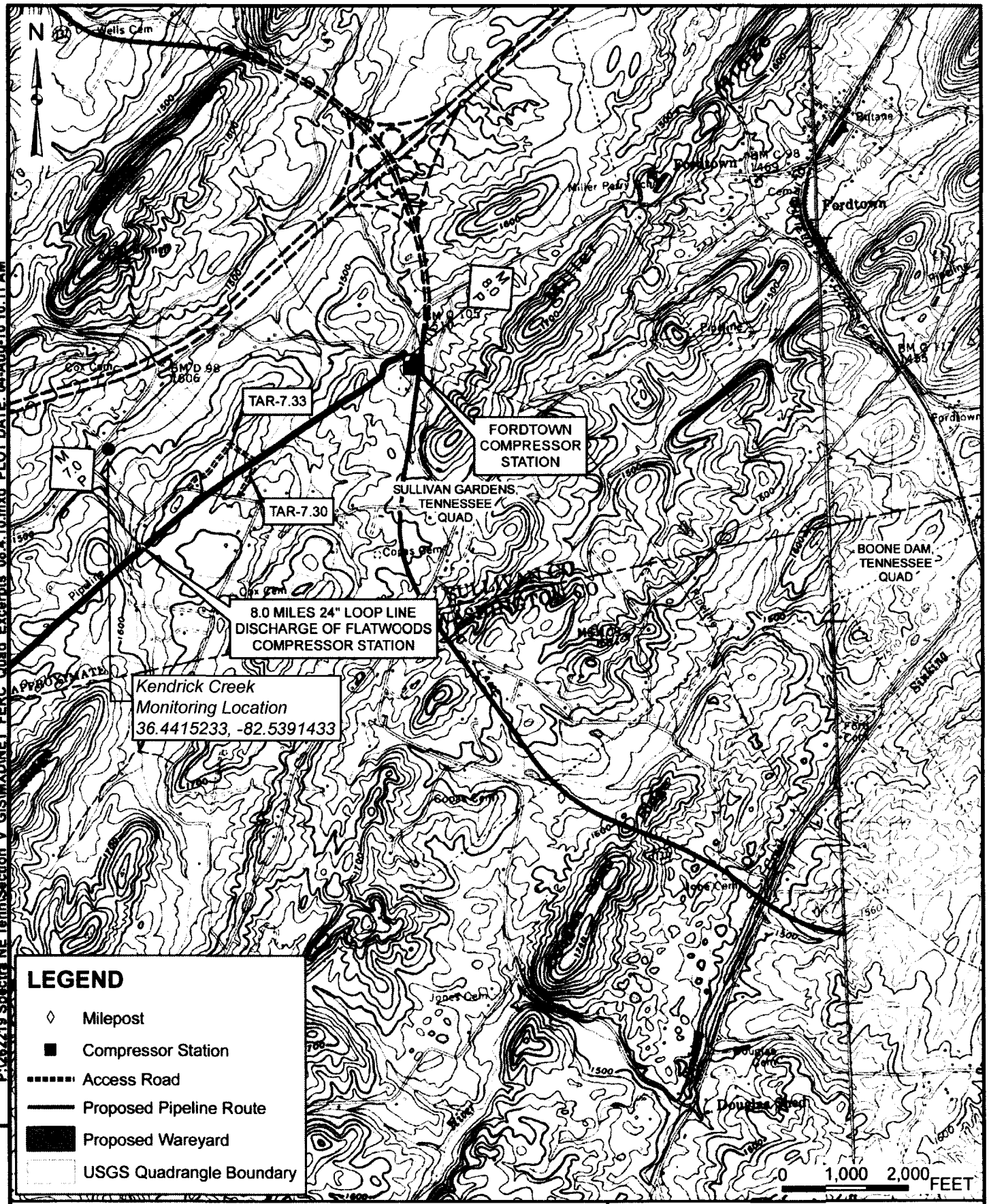
CKD. BY: HMMHOL	ENG.		DATE: 12/9/2010	W.O.
DRN. BY: HMMHOL	SCALE: 1" = 2000'		DWG. NO. FW-E-6503	

Spectra Energy Partners

East Tennessee Natural Gas, LLC
5400 Westheimer Ct. Houston, TX 77056-5310 713 627-5400



LEGEND

- Milepost
- Compressor Station
- Access Road
- Proposed Pipeline Route
- Proposed Wareyard
- USGS Quadrangle Boundary

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I.G.

TITLE: **NORTHEASTERN TENNESSEE PROJECT FLATWOODS LOOP**				
LOC.: WASHINGTON & SULLIVAN COUNTIES, TN				REV. 4
CKD. BY: HMMHOL	ENG.	DATE: 8/4/2010	W.O. 266180055	
DRN. BY: HMMHOL	SCALE: 1" = 2000'	DWG. NO. FW-E-6603		

Spectra Energy Partners

East Tennessee Natural Gas, LLC
5400 Westheimer Ct. Houston, TX 77056-5310 713 627-5400

APPENDIX B

SITE PHOTOS

Photographs of Puncheon Camp Creek Monitoring Site

Photographs of Gap Creek Monitoring Site

Photographs of Dodson Creek Monitoring Site

Photograph of Kendrick Creek Monitoring Site